

DVP04DA-S

Analog Output Module

Instruction Sheet

1 WARNING

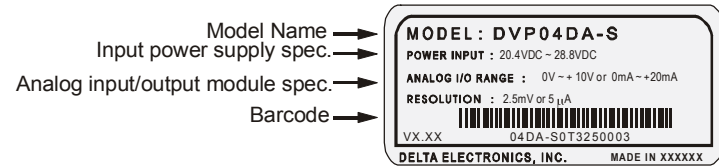
- Please carefully read this instruction thoroughly prior to use the DVP04DA-S.
- The DC input power must be OFF before any maintenance.
- This is an OPEN-TYPE built-in DVP04DA-S, and the DVP04DA-S is certified to meet IEC 61131-2 (UL 508) safety requirements when installed in the enclosure to prevent high temperature, high humidity, excessive vibration, corrosive gases, liquids, airborne dust or metallic particles. Also, it is equipped with protective methods such as some special tool or key to open the enclosure, in order to prevent the hazard to users or any damage to the DVP04DA-S.
- Do not connect the AC power to any of the input/output terminals, or it may damage the DVP04DA-S. Make sure that all the wiring is well conducted prior to power on.
- Do not touch the internal circuit for at least 1 minute after the power is OFF.
- Make sure that the DVP04DA-S is properly grounded to prevent any electromagnetic noise.

2 INTRODUCTION

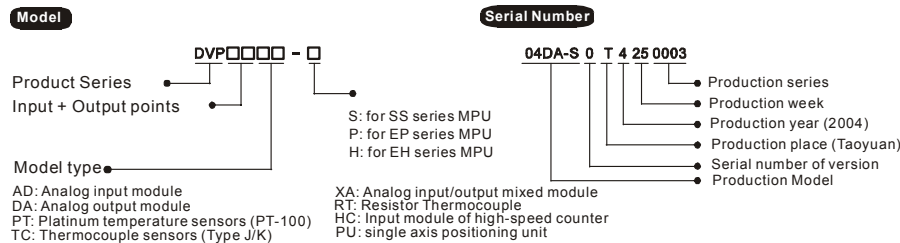
2.1 Model Explanation and Peripherals

- Thank you for choosing DELTA DVP PLC Series. The analog output module of DVP04DA-S series can read/write the data of analog output module by using commands FROM / TO via DVP-PLC SS/SA/SX MPU program. The analog output module receives 12-bit digital data of 4 groups from PLC MPU and converts it into 4 points analog output signal either in voltage or in current.
- The Software version of DVP04DA-S analog output module can be updated via RS-485 communication. Power unit and module are separate. Size is small and easy to install.
- Users can select output from voltage or current via wiring. Voltage output range is 0V ~ +10V DC (resolution is 2.5 mV). Current output range is 0mA ~ 20mA (resolution is 5 μA).

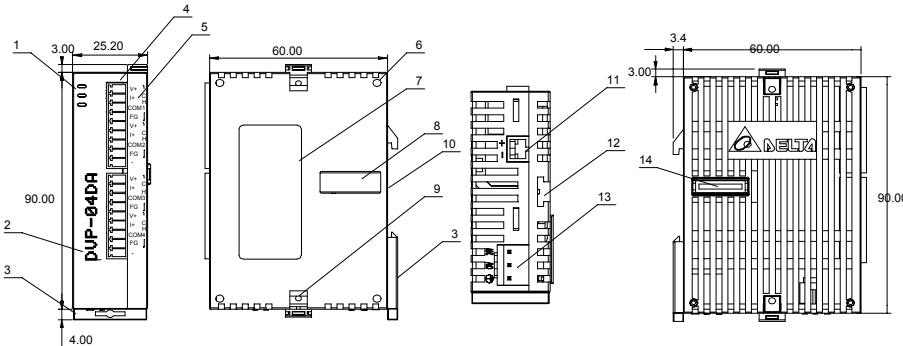
Nameplate Explanation



Model Explanation

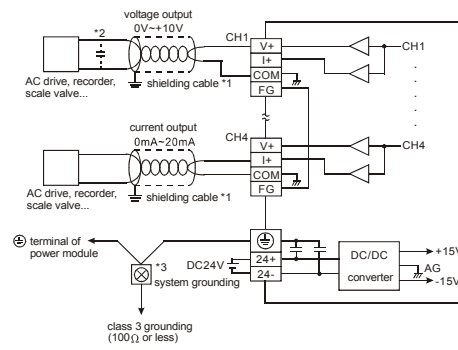


2.2 Product Profile and Outline



- Status indicator (Power, RUN and ERROR)
- Model name
- DIN rail clip
- I/O terminals
- I/O point indicator
- Mounting hole of the expansion unit
- Nameplate
- Expansion port
- Expansion unit clip
- DIN rail (35mm)
- RS-485 Communication port
- Mounting rail of the expansion unit
- DC Power input
- Expansion port

2.3 External wiring



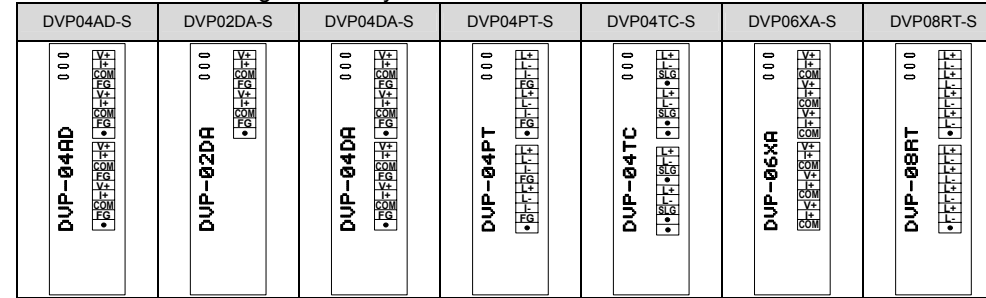
Note 1: Please isolate analog output and other power wiring.

Note 2: If noise interference from loaded input terminal wiring is significant, please connect capacitor with 0.1~0.47μF 25V for noise filtering.

Note 3: Please connect power module terminal and analog output module terminal to system earth point and make system earth point be grounded or connects to machine cover.

Warning: DO NOT wire to the No function terminal.

2.4 Terminal of analog module layout



3 STANDARD SPECIFICATIONS

3.1 Specifications

Digital/Analog (2D/A) Module	Voltage Output	Current Output
Power Supply Voltage	24 VDC (20.4VDC~28.8VDC) (-15%~+20%)	
Analog Input Channel	2 channels / each module	
Analog Output Range	0~10V	0~20mA
Digital Data Range	0~4000	0~4000
Resolution	12 bits (1 _{LSB} =2.5 mV)	12 bits (1 _{LSB} =5 μA)
Output Impedance	0.5Ω or lower	
Overall Accuracy	±0.5% of full scale of 25°C (77°F). ±1% of full scale during 0~55°C (32~131°F).	
Response Time	3 ms × channels	
Max. Output Current	20mA (1KΩ~2MΩ)	—
Tolerance Carried Impedance	—	0~500Ω
Digital Data Format	2's complementary of 16-bit, 13 Significant Bits	
Isolation Method	Isolation between digital area and analog area. But no isolation among channels.	
Protection	Voltage output has short circuit protection but a long period short circuit may cause internal wire damage and current output break.	
Communication Mode (RS-485)	Yes, communication formats are (4800 / 9600 / 19200 / 38400 / 57600 / 115200bps) Communication format: ASCII mode is 7Bit, even bit, 1 stop bit (7 E 1). Communication format of RTU mode is 8Bit, even bit, 1 stop bit (8 E 1). When connecting to PLC MPU in series, RS-485 can't be used.	
Connect to DVP-PLC MPU in Series	If DVP04DA-S modules are connected to MPU, the modules are numbered from 0 ~ 7. 0 is the closest and 7 is the furthest to the MPU. 8 modules is the max and they do not occupy any digital I/O points of the MPU.	

3.2 Other Specification

Max. Rated Consuming Power	24 VDC (20.4VDC~28.8VDC) (-15%~+20%), 4W, supply from external power
Environment Condition and Wiring	Follow the DVP-PLC MPU
Spec of Prevent Static Electricity	All places between terminals and ground comply with the spec

4 CR (Control Register)

DVP04DA-S Analog Output Module				Explanation															
CR No	RS-485 Parameters Address	Latched	Register Name	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
#0	H 4032	R	Model type	System used, data length is 8 bits (b7~b0). DVP-04DA model code=H 89															
#1	H 4033	R/W	Output mode setting	Reserved				CH4		CH3		CH2		CH1		Output mode setting: factory setting is H0000. Mode 0: output voltage mode (0V~10V). Mode 1: output voltage mode (2V~10V). Mode 2: output current mode (4mA~20mA). Mode 3: output current mode (0mA~20mA). Mode 4: none use.			
#2 ~ #5				Reserved															
#6	H 4038	R/W	CH1 output value	The output setting range of channel CH1~CH4 is K0~K4000. Factory setting is K0 and unit is LSB.															
#7	H 4039	R/W	CH2 output value																
#8	H 403A	R/W	CH3 output value																
#9	H 403B	R/W	CH4 output value																
#10 ~ #17				Reserved															
#18	H 4044	R/W	To adjust OFFSET value of CH1	It is used to set the OFFSET value of CH1~CH4. The setting range is K-2000~K2000. The factory setting is K0 and unit is LSB.															
#19	H 4045	R/W	To adjust OFFSET value of CH2																
#20	H 4046	R/W	To adjust OFFSET value of CH3																
#21	H 4047	R/W	To adjust OFFSET value of CH4																
#22 ~ #23				Reserved															
#24	H 404A	R/W	To adjust GAIN value of CH1	It is used to set the GAIN value of CH~CH4. The setting range is K-1600~K8000. The factory setting is K2000 and unit is LSB.															
#25	H 404B	R/W	To adjust GAIN value of CH2																
#26	H 404C	R/W	To adjust GAIN value of CH3																
#27	H 404D	R/W	To adjust GAIN value of CH4																
#28 ~ #29				Reserved															
#30	H 4050	R	Error status	Data register to save all error status. Please refer to fault code chart for detail.															
#31	H 4051	R/W	Communication address setting	Used to set RS-485 communication address. The setting range is from 01 to 255 and the factory setting is K1.															
#32	H 4052	R/W	Communication Baud Rate setting	Used to set communication baud rate (4800, 9600, 19200, 38400, 57600, 115200bps). Communication format: ASCII mode is 7Bit, even bit, 1 stop bit (7 E 1). Communication format of RTU mode is 8Bit, even bit, 1 stop bit (8 E 1). b0: 4800 bps (bit/sec). b1: 9600 bps (bit/sec). (Factory setting) b2: 19200 bps (bit/sec). b3: 38400 bps (bit/sec). b4: 57600 bps (bit/sec). b5: 115200 bps (bit/sec). b6~b13: reserved. b14: exchange low and high byte of CRC check code (RTU mode only) b15: ASCII / RTU mode selection															
#33	H 4053	R/W	Reset to factory setting and set characteristics adjustable priority	Reserved				CH4		CH3		CH2		CH1		Output latched setting, factory setting H0000. Give CH1 setting for example: 1. When b0=0, user can set OFFSET and GAIN value of CH1 (CR#18, CR#24). When b0=1, inhibit user to adjust OFFSET and GAIN value of CH1 (CR#18, CR#24). 2. b1 is used to check if characteristic register is latched. b1=0 latched (factory setting), b1=1 not latched. 3. When b2 is set to 1, all settings are reset to factory setting.			
#34	H 4054	R	Software version.	Show software version in hexadecimal. For example: H 010A means 1.0A.															
#35~#48			System used	System used															

○ means latched. × means not latched. R means can read data by using FROM command or RS-485. W means can write data by using TO command or RS-485. LSB (Least Significant Bit): 1. Voltage output: 1_{LSB}=10V/8000=2.5mV. 2. Current output: 1_{LSB}=20mA/4000=5μA.

Explanation:

- The content of CR#0 is model type, user can read the data from program to check if there is expansion module.
- CR#1 is used to set two internal channels working mode of analog output module. Every channel has four modes that can be set individually. For example: if setting CH1 to mode 2 (b2~b0=010), CH2 to mode 1 (b5~b3=001). It needs to set CR#1 to H000A. The factory setting of CR#1 is H0000.
- CR#2 ~ CR#5, CR#10 ~ CR#17, CR#22, CR#23, CR#28, CR#29 Reserved.
- CR #6 ~ CR#9 display CH1 ~ CH4 output signals. The setting range is K0~K4000. Factory setting is K0 and unit is LSB.
- CR#18 ~ CR#21 are used to adjust the OFFSET value of CH1 and CH4. The factory setting is K0 and unit is LSB. If output value equal to 0 after calculation, the adjustable range of analog output voltage or current is -2000~+2000.
Voltage adjustable range: -5V~+5V(-2000_{LSB}~+2000_{LSB}).
Current adjustable range: -10mA~+10mA(-2000_{LSB}~+2000_{LSB}).
- CR#24 ~ CR#27 are used to adjust the GAIN value of CH1 and CH4. The factory setting is K2000 and unit is LSB. If output value equal to 2000 after calculation, the adjustable range of analog output voltage or current is -1600~+8000.
Voltage adjustable range: -4V~+20V(-1600_{LSB}~+8000_{LSB}).
Current adjustable range: -8mA ~+40mA (-1600_{LSB}~+8000_{LSB}).
Please be noticed that GAIN VALUE - OFFSET VALUE = +400_{LSB} ~+6000_{LSB} (voltage or current). If the value difference comes up small (within range), the output signal resolution is then slim and the variation is definitely larger. On the contrast, if the value difference exceeds the range, the output signal resolution becomes larger and the variation is definitely smaller.
- CR#30 is fault code. Please refer to the following chart.

Fault Description	Content	b15~b8	b7	b6	b5	b4	b3	b2	b1	b0
Power Source Abnormal	K1(H1)	Reserved	0	0	0	0	0	0	0	1
Analog Input Value Error	K2(H2)		0	0	0	0	0	0	1	0
Setting Mode Error	K4(H4)		0	0	0	0	0	1	0	0
Offset/Gain Error	K8(H8)		0	0	0	0	1	0	0	0
Hardware Malfunction	K16(H10)		0	0	0	1	0	0	0	0
Digital Range Error	K32(H20)		0	0	1	0	0	0	0	0
Average Times Setting Error	K64(H40)		0	1	0	0	0	0	0	0
Command Error	K128(H80)		1	0	0	0	0	0	0	0

Note: Each fault code will have corresponding bit (b0~b7). Two or more faults may happen at the same time. 0 means normal and 1 means having fault.

- CR#31 is used to set RS-485 communication address. The setting range is from 01 to 255. The factory setting is K1.
- CR#32 is used to set RS-485 communication baud rate: 4800, 9600, 19200, 38400, 57600, 115200

